

Amendments to the Specification:

Please amend the specification as follows:

Please replace the title with the following new title:

SEMICONDUCTOR DEVICE INCLUDING LADDER-SHAPED SILOXANE
HYDRIDE AND METHOD FOR MANUFACTURING SAME

Please replace the paragraph starting at page 9, line 6, with the following rewritten paragraph:

Fig. 5 is a table showing the physical properties of ladder-shaped siloxane hydride (L-OxTM).

Please replace the paragraph starting at page 9, line 7, with the following rewritten paragraph:

Fig. 6 is an IR spectrum of ladder-shaped siloxane hydride (L-OxTM).

Please replace the paragraph starting at page 9, line 8, with the following rewritten paragraph:

Fig. 7 is a graph showing the dependence of the refractive index and the density of the ladder-shaped siloxane hydride (L-OxTM) on the baking condition.

Please replace the paragraph starting at page 9, line 10, with the following rewritten paragraph:

Fig. 8A is a histogram showing the results of the measurement of the dielectric constant, and Figs. 8B and 8C are schematic diagram of the layer structure of the samples for evaluating the dielectric constant of HSQ and ladder-shaped siloxane hydride (L-OxTM).

Please replace the paragraph starting at page 11, line 7, with the following rewritten paragraph:

Fig. 4 shows a chemical structure of the ladder-shaped siloxane hydride (L-OxTM), which has ladder-shaped siloxane hydride structure. The sign "n" appeared in the structure indicates a positive number of equal to or greater than 1. Fig. 5 shows physical properties of the ladder-shaped siloxane hydride (L-OxTM) having such chemical structure.

Please replace the paragraph starting at page 11, line 12, with the following rewritten paragraph:

It was confirmed by the results of the FT-IR measurement shown in Fig. 6 that the ladder-shaped siloxane hydride (L-OxTM) has the chemical structure shown in Fig. 4. The characteristic feature found in the chart of Fig. 6 is a sharp peak appeared at about 830 cm⁻¹ indicating the presence of Si-H bond, and the rapid ascent of the peak suggests that the ladder-shaped siloxane hydride (L-OxTM) has a two-dimensional chemical structure. Also, an expected another peak indicating the presence of Si-H bond, which is expected to appear at a higher wave number side around approximately 870 cm⁻¹, is extremely small, and thus this also indicates that the material to be measured has the two-dimensional chemical structure.

Please replace the paragraph starting at page 11, line 24, with the following rewritten paragraph:

The physical properties of the ladder-shaped siloxane hydride (L-OxTM) are also variable depending on the baking temperature. This will be described on the basis of the disclosure of Fig. 7.

Please replace the paragraph starting at page 12, line 1, with the following rewritten paragraph:

The ladder-shaped siloxane hydride (L-OxTM) formed by baking within the inert gas atmosphere such as nitrogen or the like at a temperature within a range of from 200 degree C to 400 degree C has the following properties. In Fig. 7, "R.I." indicates the refractive index at a wavelength of 633 nm. The refractive index is a parameter that directly has an influence on the dielectric constant, and the value thereof varies within a range of from 1.38 to 1.40. The

values of the refractive indexes thereof at a temperature lower than 200 degree C or at a temperature higher than 400 degree C were higher than 1.40.

Please replace the paragraph starting at page 12, line 12, with the following rewritten paragraph:

The densities of the ladder-shaped siloxane hydride (L-OxTM) formed by baking at a temperature from 200 degree C to 400 degree C were 1.50 g/cm³ to 1.58 g/cm³. The density of the film baked at a temperature higher than 400 degree C was higher than 1.60 g/cm³. The density of the film baked at a temperature lower than 200 degree C was not measurable.

Please replace the paragraph starting at page 12, line 24, with the following rewritten paragraph:

The above results indicate that ladder-shaped siloxane hydride (L-OxTM) having better properties as well as having lower dielectric constant can be stably obtained by baking at an atmosphere temperature from 200 degree C to 400 degree C when the insulating film including the ladder-shaped siloxane hydride (L-OxTM) is deposited.

Please replace the paragraph starting at page 13, line 8, with the following rewritten paragraph:

The two materials having the above described structures have considerably different film stabilities during the manufacturing processes, and the ladder-shaped siloxane hydride (L-OxTM) exhibits markedly superior film stability to HSQ. It is considered that this is because the decrease of Si-H content in ladder-shaped siloxane hydride (L-OxTM) during the manufacturing process is lower than that in HSQ. It is also considered that the difference in the manner of forming bonds with hydrogen atoms is also a reason thereof. More specifically, in HSQ, hydrogen atom is bonded thereto at a corner of the cubic structure, and meanwhile in ladder-shaped siloxane hydride (L-OxTM), hydrogen atom is bonded thereto at a portion of the side of the ladder structure. Therefore, the density around hydrogen atoms of HSQ is lower than that of ladder-shaped siloxane hydride (L-OxTM), and thus it is considered

that hydrogen bond included in HSQ is more reactive than hydrogen bond included in ladder-shaped siloxane hydride (L-OxTM) for the structural reason.

Please replace the paragraph starting at page 13, line 24, with the following rewritten paragraph:

Next, first samples that are provided with a film having lower dielectric constant on a silicon substrate, and another samples that are further provided with a cap film of SiO₂ film on the first samples, were manufactured, and the results of the measurements of the dielectric constants thereof are shown in Fig 8A. Two types of the films having lower dielectric constant, that are ladder-shaped siloxane hydride (L-OxTM) and HSQ (hydrogen silsesquioxane), were employed. The layer structures of the samples are shown in Figs. 8B and 8C. The thicknesses of the layers in the samples are as follows:

Please replace the paragraph starting at page 14, line 10, with the following rewritten paragraph:

Comparison of the dielectric constants of the low-k film alone with the cap film and without the cap film were conducted, and it was found that the dielectric constant of HSQ was changed from 2.9 for having no cap layer to 3.5 for having the cap layer, and on the contrary, the dielectric constant of the ladder-shaped siloxane hydride (L-OxTM) was not considerably changed, regardless of the presence of the cap layer.

Please replace the paragraph starting at page 16, line 7, with the following rewritten paragraph:

In the method for manufacturing the semiconductor device according to the present embodiment, an underlying insulating film 201 is disposed on a substrate 200 (~~not shown~~) having a semiconductor device formed thereon, and a SiCN film 202, which will be an etch stop film at the stage of forming an interconnect groove, is deposited via plasma CVD thereon to a thickness of 50 nm. Then, a L-OxTM film 203 is formed by an applying method to a thickness of 300 nm, and the baking processing is carried out within N₂ atmosphere at 400 degree C for 30 minutes. Subsequently, a SiO₂ film 204 is deposited to a thickness of 100 nm

(Fig. 9A). The deposition process of the SiO₂ film 204 is carried out by employing a source gas containing SiH₄ and N₂O, and the volumetric flow rates of SiH₄ and N₂O are set to 200 to 300 sccm and 3,500 to 4,000 sccm, respectively.